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*              Report Number                                 *
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*              DBMS.NASA/RECON-16                            *
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The USL/DBMS NASA/RECON Working Paper Series contains a collection of reports representing results of activities being conducted by the Computer Science Department of the University of Southwestern Louisiana pursuant to the specifications of National Aeronautics and Space Administration Contract Number NASW-3846. The work on this contract is being performed jointly by the University of Southwestern Louisiana and Southern University.

For more information, contact:

Wayne D. Dominick

Editor
USL/DBMS NASA/RECON Working Paper Series
Computer Science Department
University of Southwestern Louisiana
P. O. Box 44330
Lafayette, Louisiana 70504
(318) 231-6308

THE DESIGN OF PC/MISI, A PC-BASED
COMMON USER INTERFACE TO REMOTE
INFORMATION STORAGE AND RETRIEVAL SYSTEMS:
PRESENTATION VISUALS

Philip P. Hall

The University of Southwestern Louisiana
Center for Advanced Computer Studies
Lafayette, Louisiana

April 24, 1985

THE DESIGN OF PC/MISI, A PC-BASED COMMON USER INTERFACE TO REMOTE INFORMATION STORAGE AND RETRIEVAL SYSTEMS

A Thesis
Presented to
The Graduate Faculty of
The University of Southwestern Louisiana
In Partial Fulfillment of the
Requirements for the Degree
Master of Science

Philip P. Hall
April 1985

OUTLINE

*** Problem Definition

*** The Personal Computer Solution

*** Goals of System Design

*** Design Description

*** Future Considerations

*** The Research Environment

*** Conclusions

PROBLEM DEFINITION

RATIONALE FOR COMMON INTERFACE

*** Content of IS&R Systems

*** Problems In Providing Access

*** Increase in PC Processing Power

*** Research Possibilities

PROBLEM DEFINITION

DEFINING THE CASUAL USER

*** 70% of User Population

*** Characteristics

      *** No Desire to Memorize Command Languages

      *** Infrequent Access to System

      *** Limited Knowledge of Programming
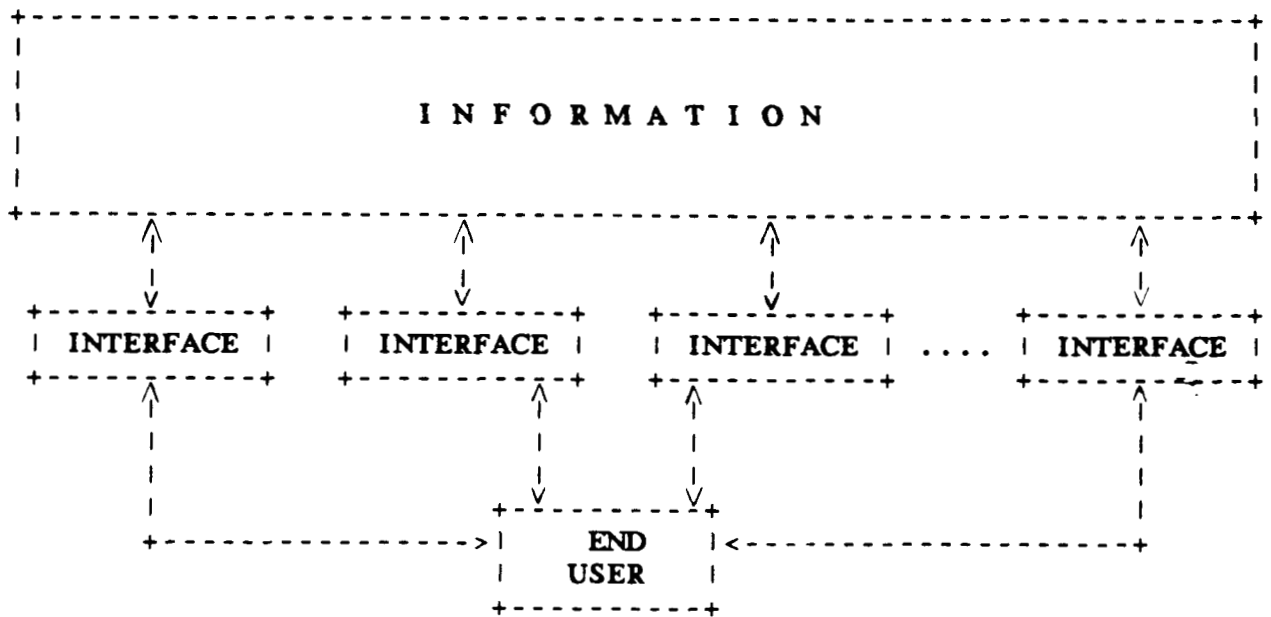
      *** Limited Knowledge of Command Languages

      *** Extensive Knowledge of Subject Field

      *** IS&R Access not REQUIRED By Job

      *** Job Enhancement Thru IS&R Access
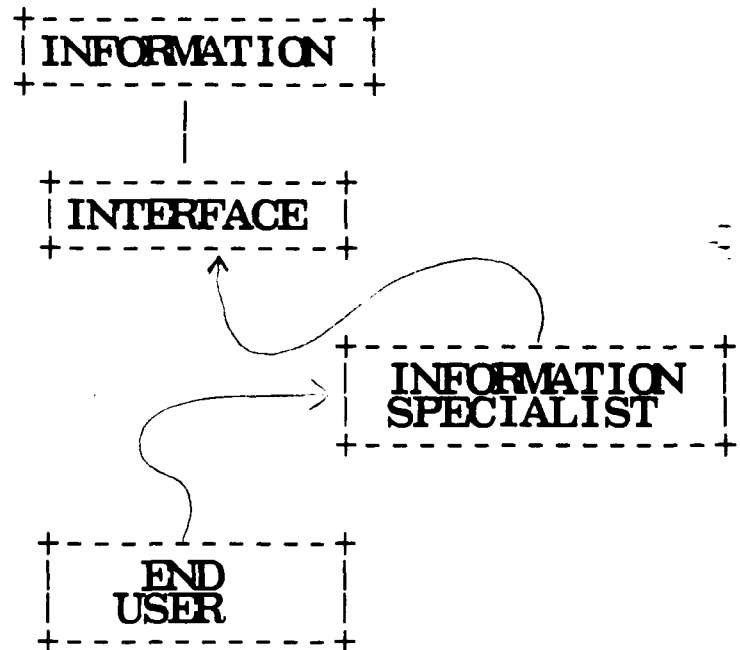
PROBLEM DEFINITION

CURRENT ACCESS METHOD

```
+-----------------------------------------------------------------+
|                                                                 |
|                                                                 |
|              I N F O R M A T I O N                              |
|                                                                 |
|                                                                 |
+-----------------------------------------------------------------+
         ^                ^                ^                ^
         |                |                |                |
         v                v                v                v
  +-----------+    +-----------+    +-----------+    +-----------+
  | INTERFACE |    | INTERFACE |    | INTERFACE |....| INTERFACE |
  +-----------+    +-----------+    +-----------+    +-----------+
         ^                ^                ^                ^
         |                |                |                |
         |                v                v                |
         |          +------------+                          |
         +---------->|    END     |<------------------------+
                     |    USER    |
                     +------------+
```

PROBLEM DEFINITION

INFORMATION SPECIALIST USAGE

```
+--------------+
| INFORMATION  |
+--------------+
       |
       |
+--------------+
| INTERFACE    |
+--------------+
          ↑                        +------------------+
                          →------> | INFORMATION      |
                                   | SPECIALIST       |
                                   +------------------+

+--------------+
|     END      |
|    USER      |
+--------------+
```

THE PERSONAL COMPUTER SOLUTION

REQUIRED PROCESSING CAPABILITIES

*** Translate User Input into Host System Commands

*** Interpret Host System Responses

*** Storage and Manipulation of Accessions Retrieved from Host

*** Utilization of Specialized Input Devices

*** Modification of Screen Display Characteristics

THE PERSONAL COMPUTER SOLUTION

POSSIBLE ACCESS METHODOLOGIES

*** Terminal -> Host
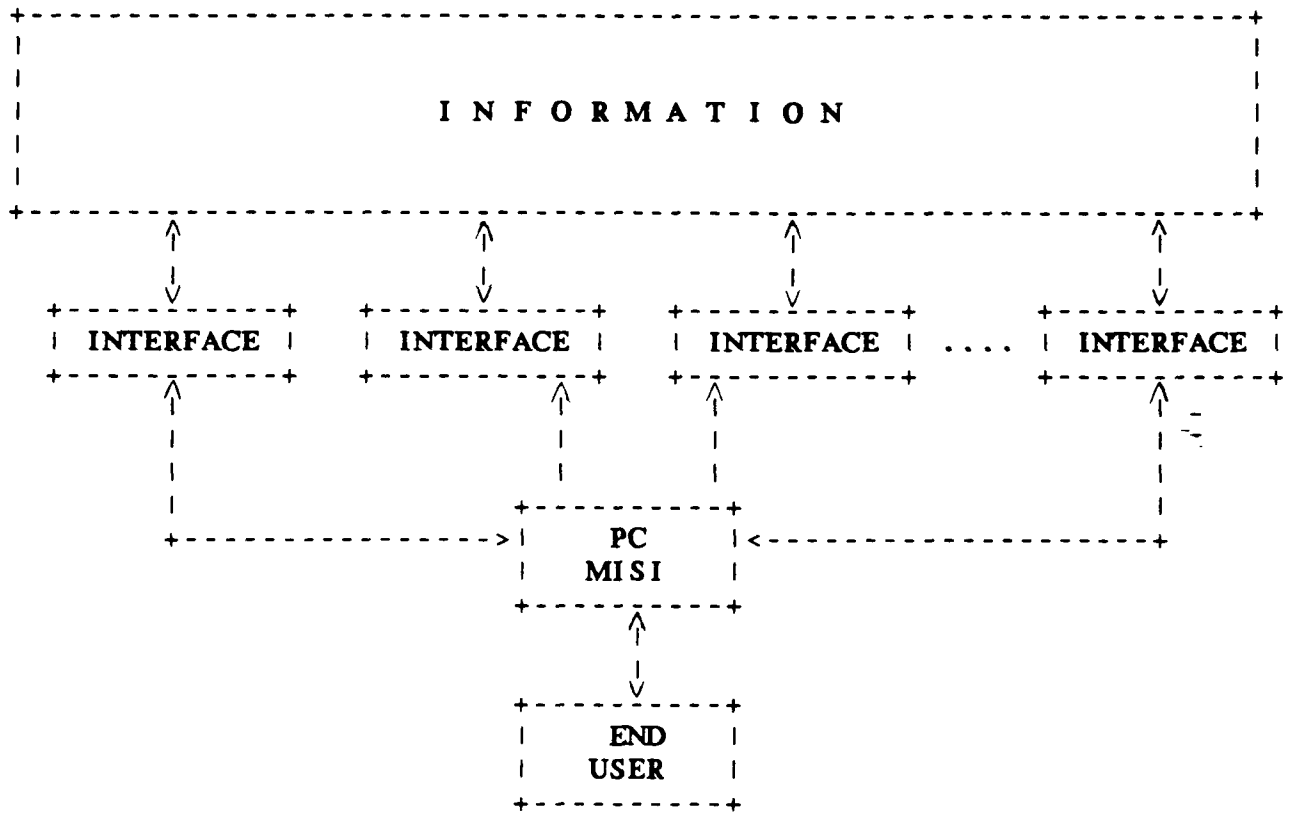
*** Terminal -> Gateway -> Host

*** Terminal -> Local Mainframe -> Host

```
                              +-> Host
                              |
*** Personal Computer ->      |-> Gateway -> Host
                              |
                              +-> Local Mainframe -> Host
```

*** Distribution of Functionality

THE PERSONAL COMPUTER SOLUTION

```
+-----------------------------------------------------------------+
|                                                                 |
|                                                                 |
|               I N F O R M A T I O N                             |
|                                                                 |
|                                                                 |
+-----------------------------------------------------------------+
       ^                  ^                  ^                  ^
       |                  |                  |                  |
       v                  v                  v                  v
 +-----------+      +------------+      +-----------+      +-----------+
 | INTERFACE |      | INTERFACE  |      | INTERFACE |  ....| INTERFACE |
 +-----------+      +------------+      +-----------+      +-----------+
       ^                  ^                  ^                  ^
       |                  |                  |                  |
       |                  |                  |                  |
       |                +-----------+        |                  |
       +--------------->|    PC     |<-------+------------------+
                        |   MISI    |
                        +-----------+
                              ^
                              |
                              v
                        +-----------+
                        |    END    |
                        |   USER    |
                        +-----------+
```

THE PERSONAL COMPUTER SOLUTION

FEASABILITY OF IMPLEMENTATION

1) The identification of host system functions which are used by casual users

2) The determination that these functions are provided by the target systems

3) The identification of local processing needs

4) The development of a standard set of commands to be mapped into the required host system functions

5) The mapping of the standard command set into commands recognizable by the host system

6) The identification of hardware requirements for the implementation of the system.

GOALS OF SYSTEM DESIGN

GOAL 1: Design a system which allows ease of access to multiple information systems to both the casual user and the experienced user.

GOAL 2: Utilize the local processing capabilities of the personal computer to enhance the search and retrieval process.

GOAL 3: Design a system which provides the user with sufficient guidance and interactive capability to allow the utilization of his subject knowledge in the development of system search strategies.

GOAL 4: Design a system which utilizes state-of-the-art interface design tools available for personal computers while retaining maximum portability.

GOAL 5: Design a system which may be used for research activities related to the improvement of access to IS&R systems and which provides the necessary monitoring and evaluation tools for such research.

GOAL 6: Define future system enhancements.

DESIGN DESCRIPTION

FUNCTIONALITY REQUIRED

*** Remote Processing

     *** Connect to System   *** Disconnect from System

     *** Search Subject   *** Search Author

     *** Search Accession Number   *** Search Title

     *** Search Corporate Source   *** Display Accession

     *** List Adjacent Terms   *** List Related Terms

     *** Boolean Operations   *** Change Database

     *** Print System News   *** Limit Search

     *** Remote Print   *** Search Text

     *** Set Status   *** Release All Sets

     *** Sort Set

*** Local Processing

     *** Save Accession   *** Sort File

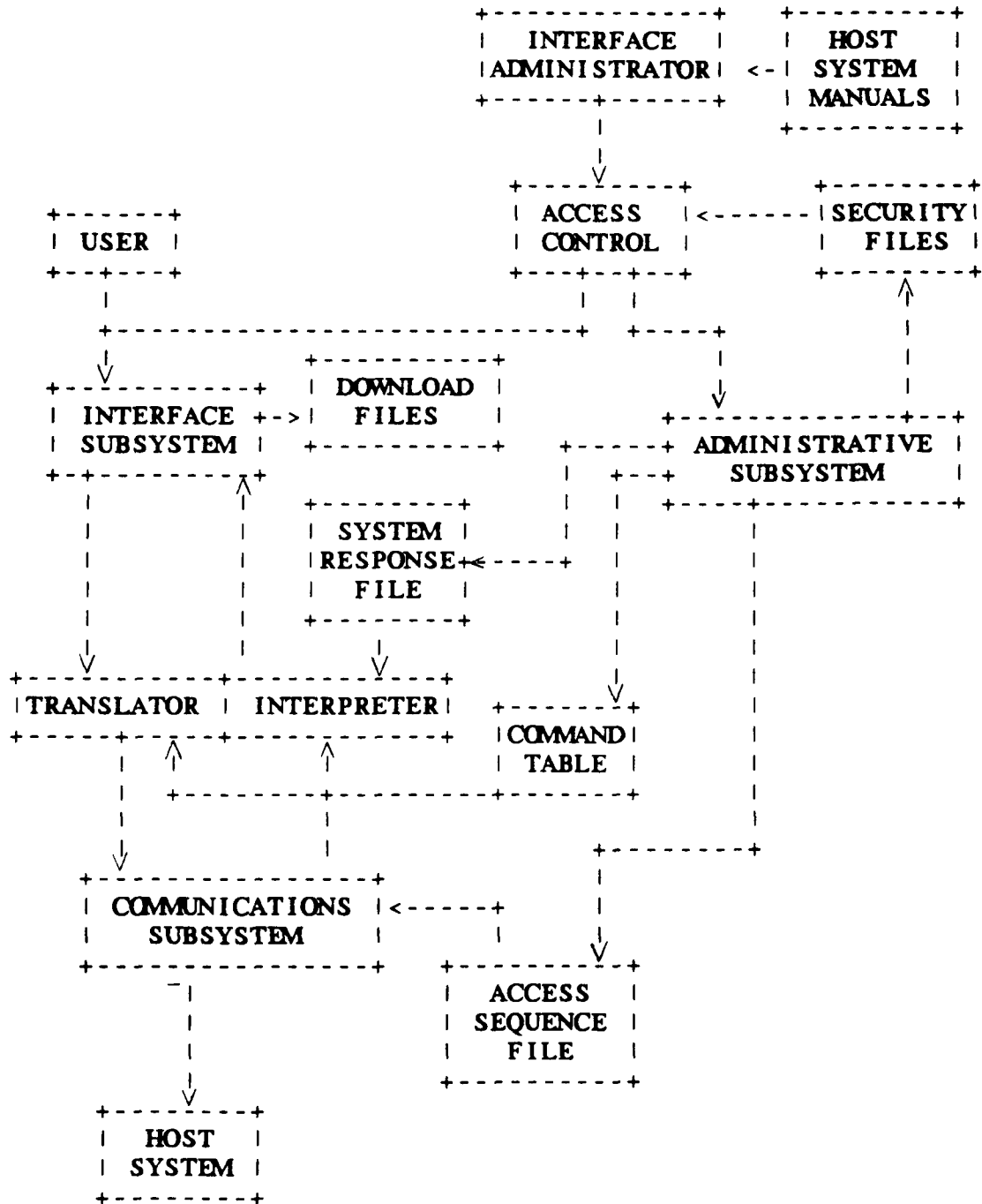   *** Merge Files   *** Local Print

     *** Name Download File   *** Delete Local File

     *** Display Accession   *** Delete Accession

DESIGN DESCRIPTION

SYSTEM DATA FLOW

```
                              +-------------+   +---------+
                              |  INTERFACE  |   |  HOST   |
                              |ADMINISTRATOR|  <-| SYSTEM  |
                              +------+------+   | MANUALS |
                                     |          +---------+
                                     |
                                     V
                              +----------+     +---------+
 +-------+                    |  ACCESS  |<------|SECURITY|
 | USER  |                    | CONTROL  |     |  FILES  |
 +--+----+                    +--+--+--+-+     +----+----+
    |                            |  |               ^
    +----------------------------+  +----+          |
    |              +----------+        |            |
    V              | DOWNLOAD |        |            |
 +--------------+  |  FILES   |        V            |
 | INTERFACE +->|  +----------+   +-----------+--+  |
 | SUBSYSTEM |  +----------+      +------+ ADMINISTRATIVE |
 +-+--------^-+                   |      +--+ SUBSYSTEM    |
   |        |     +---------+     |      |  +----+---------+
   |        |     | SYSTEM  |     |      |       |
   |        |     |RESPONSE+<----+      |       |
   |        |     |  FILE   |     |      |       |
   |        |     +---------+     |      |       |
   |        |                     |      |       |
   V        |          V          |      |       |
 +----------+----------+----+  +-------V-+      |
 |TRANSLATOR | INTERPRETER|   |COMMAND |       |
 +------+-+--+---+--------+   | TABLE  |       |
        | ^      ^           +--------+       |
        | +----------+--------+-------+       |
        |          |                  |       |
        V          |                  +--------+
 +----------------+                   |
 | COMMUNICATIONS |<-----+            |
 |   SUBSYSTEM    |      |            V
 +---------------+  +---------+
        |           | ACCESS  |
        |           |SEQUENCE |
        V           |  FILE   |
 +---------+        +---------+
 |  HOST   |
 | SYSTEM  |
 +---------+
```

DESIGN DESCRIPTION

THE INTERFACE SUBSYSTEM

*** Three Levels of Interaction

    *** Menu-Driven Interaction

    *** Command-Driven Interaction

    *** Direct System Interaction

*** Batch Processing Capability

*** Error Handling

    *** Input Errors

    *** Host System Errors

*** Local Storage and Processing of Accessions

DESIGN DESCRIPTION

THE TRANSLATOR/INTERPRETER SUBSYSTEM

*** The Translator

    *** Convert PC/MISI Commands into Host Commands

    *** Send Results to Communication Subsystem

    *** Uses System Command Table

*** The Interpreter

    *** Accepts System Response from Communication Subsystem

    *** Interprets System Response

    *** Performs Necessary Transformations on Host Response

    *** Passes Result to Interface Subsystem

DESIGN DESCRIPTION

THE COMMUNICATIONS SUBSYSTEM

*** Initialize Communications Parameters

*** Transmit Commands to Host System

*** Accept and Store Host System Responses

*** Reset Communications Parameters

DESIGN DESCRIPTION

THE ADMINISTRATIVE SUBSYSTEM

*** Create and Maintain System Files

     *** Access Sequence Files

     *** System Command Files

     *** System Response Files

     *** System Security File

*** Utilization of Evaluation Monitors

DESIGN DESCRIPTION

RESOURCE REQUIREMENTS

*** User Requirements

    *** IBM PC or PC Compatible

    *** Minimum 256K Memory

    *** Dual Floppy Drives or Hard Disk

    *** Hayes-1200 or Compatible Modem

    *** Light Pen (Optional)

*** Development Requirements

    *** Hardware

        *** IBM PC/XT

        *** Hayes-1200 or Compatible Modem

        *** Color Monitor

        *** Light Pen

    *** Software

        *** C Compiler

        *** Window Generation Library

        *** Statistical Support Package

FUTURE CONSIDERATIONS

FUTURE ENHANCEMENTS

*** Expert System / AI Applications
   *** Enhance User Queries
   *** "Advice" to Users
   *** "Find" System With Information

*** Organize Information into Reports

*** Extension to Generalized DBMSs

FUTURE CONSIDERATIONS

RESEARCH POTENTIAL

*** Menu vs. Command vs. Direct Access
    (and later) vs. Common Commands
                 vs. Natural Language

*** Interface Configurations

    *** Input Devices

    *** Display Characteristics

*** Expert System Applications

*** Extraction and Organization of Information

PC/MISI LEVELS

```
+-------------------------------------------------------------------+
|                                                                   |
|       Level 5 Natural Language/Expert System                      |
| ----------------------------------------------------------------- |
|                                                                   |
|       Level 4 Common Command Language                             |
| ----------------------------------------------------------------- |
| ----------------------------------------------------------------- |
|                                                                   |
|       Level 3 Menu Driven System                                  |
| ----------------------------------------------------------------- |
|                                                                   |
|       Level 2 PC/MISI Command Language                            |
| ----------------------------------------------------------------- |
|                                                                   |
|       Level 1 Direct Interaction With Host                        |
|                                                                   |
+-------------------------------------------------------------------+
```
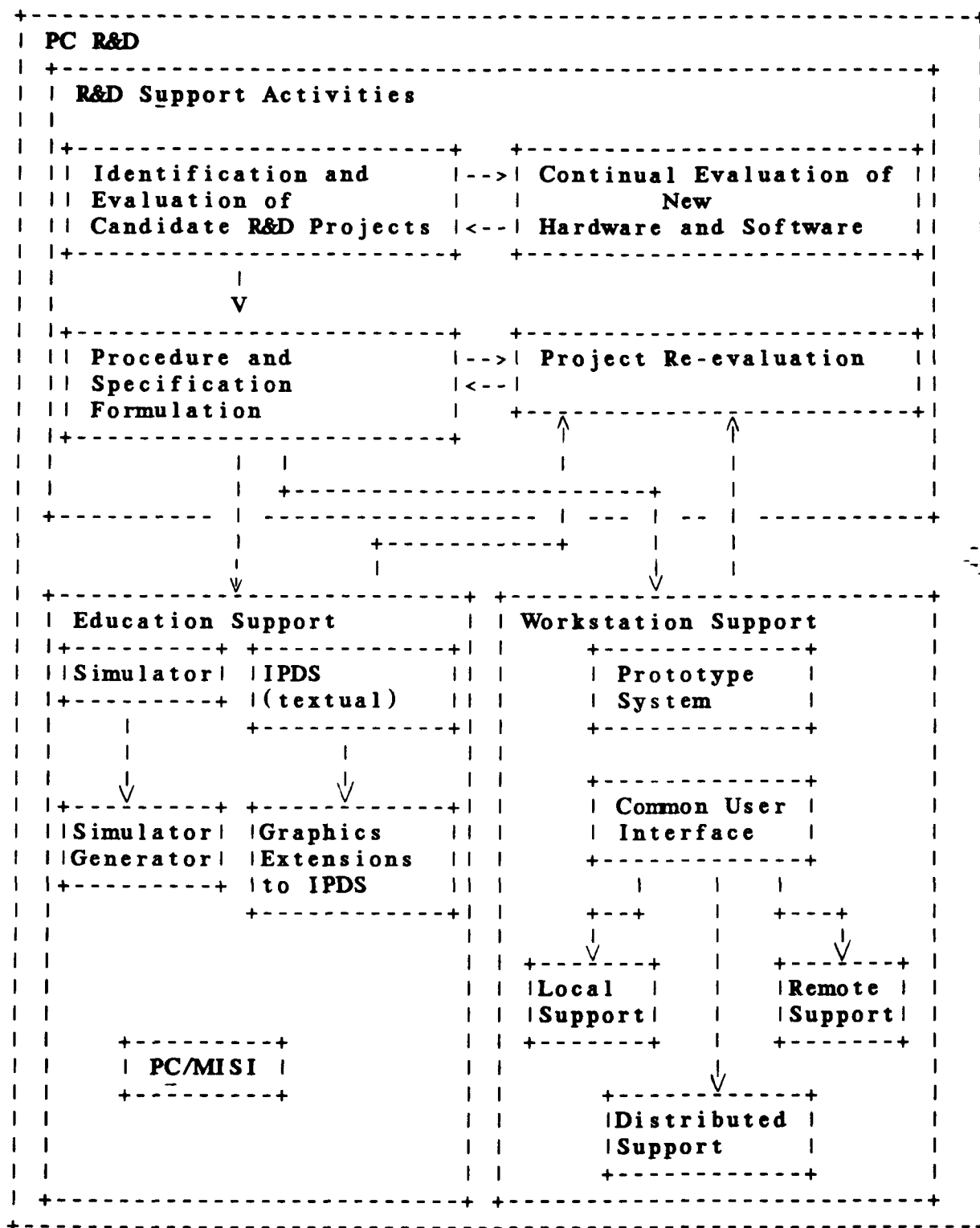
N A S A
Personal Computer
Research
and
Development

THE RESEARCH ENVIRONMENT

```
+-----------------------------------------------------------------------+
| PC R&D                                                                |
|                                                                       |
| +-------------------------------------------------------------------+ |
| | R&D Support Activities                                            | |
| |                                                                   | |
| |+-----------------------------+    +----------------------------+| |
| || Identification and          |-->| Continual Evaluation of    || |
| || Evaluation of               |   |            New              || |
| || Candidate R&D Projects      |<--| Hardware and Software       || |
| |+-----------------------------+    +----------------------------+| |
| |              |                                                  | |
| |              V                                                  | |
| |+-----------------------------+    +----------------------------+| |
| || Procedure and               |-->| Project Re-evaluation       || |
| || Specification               |<--|                             || |
| || Formulation                 |   +----------------------------+| |
| |+-----------------------------+              ^           ^       | |
| |  |           |    |                         |           |       | |
| |  |           |    +------------------------+|           |       | |
| +--|--------   |--------------------------- |--- |-- |-----------+ |
| |              |                            |    |   |            |
| |              |                   +----------+  |   |            |
| |              V        |          +----------+  V   |            |
| +-----------------------+    +----------------------------+       |
| | Education Support     |    | Workstation Support        |       |
| |            +---------+ |    |               +---------+ |       |
| |            | PC/MISI | |    |               | PC/MISI | |       |
| |            +---------+ |    |               +---------+ |       |
| +-----------------------+    +----------------------------+       |
|                                                                   |
+-----------------------------------------------------------------------+
```

```
+------------------------------------------------------------------+
I  PC R&D                                                          I
I  +------------------------------------------------------------+  I
I  I  R&D Support Activities                                    I  I
I  I                                                            I  I
I  I+-----------------------------+  +-------------------------+I  I
I  II  Identification and         I-->I Continual Evaluation of II  I
I  II  Evaluation of              I   I         New             II  I
I  II  Candidate R&D Projects     I<--I Hardware and Software    II  I
I  I+-----------------------------+  +-------------------------+I  I
I  I              I                                             I  I
I  I              V                                             I  I
I  I+-----------------------------+  +-------------------------+I  I
I  II  Procedure and              I-->I Project Re-evaluation   II  I
I  II  Specification              I<--I                         II  I
I  II  Formulation                I   +-------------------------+I  I
I  I+-----------------------------+                             I  I
I  I         I    I        I   I                        I       I  I
I  I         I    I        I   +------------------------+        I  I
I  +---------I-------------------------I---I--I-------------------+  I
I            I           +----------+      I  I                   _I
I            I           I          I      V  I                  -I
I  +---------V-----------------------+  +------V------------------+  I
I  I Education Support               I  I Workstation Support     I  I
I  I+---------+  +------------+I  I       +-------------+         I  I
I  IISimulatorI  IIPDS        II  I       I Prototype   I         I  I
I  I+---------+  I(textual)   II  I       I System      I         I  I
I  I     I      +------------+I  I       +-------------+         I  I
I  I     I           I        I  I                                I  I
I  I     V           V        I  I       +-------------+         I  I
I  I+---------+  +-----------+I  I       I Common User I         I  I
I  IISimulatorI  IGraphics    II  I       I Interface   I         I  I
I  IIGeneratorI  IExtensions  II  I       +-------------+         I  I
I  I+---------+  Ito IPDS     II  I         I    I    I           I  I
I  I            +-----------+I  I         +--+   I  +--+         I  I
I  I                          I  I         V     I     V         I  I
I  I                          I  I  +----V----+  I +----V----+   I  I
I  I                          I  I  ILocal    I  I IRemote   I   I  I
I  I                          I  I  ISupportI  I ISupportI   I  I
I  I    +----------+          I  I  +--------+  I +--------+  I  I
I  I    I PC/MISI  I          I  I              V             I  I
I  I    +----------+          I  I        +-----V------+      I  I
I  I                          I  I        IDistributed I      I  I
I  I                          I  I        ISupport     I      I  I
I  I                          I  I        +------------+      I  I
I  +--------------------------+  +-------------------------+  I  I
+------------------------------------------------------------------+
```

Figure 5.

CONCLUSIONS

*** Place of PC in Information Retrieval

*** Feasibility of Implementation

*** Research Potential

*** Goal Attainment

OBJECTIVES OF SYSTEM DESIGN

OBJECTIVE 1: Provide Ease of Access to Multiple Systems.

OBJECTIVE 2: Provide for Addition of New Systems.

OBJECTIVE 3: Develop System Documentation

OBJECTIVE 4: Provide Multilevel Capabilities.

OBJECTIVE 5: Maintain User Orientation.

OBJECTIVE 6: Utilize User's Knowledge.

OBJECTIVE 7: Facilitate Downloading of Information.

OBJECTIVE 8: Provide Batch Processing Capabilities.

OBJECTIVE 9: Provide Error Handling Capabilities.

OBJECTIVE 10: Extract Maximum Benefit from Display Capabilities

OBJECTIVE 11: Identify Necessary Data for Evaluation.

OBJECTIVE 12: Design Data Collection Tools.

OBJECTIVE 13: Identify Uses of Artificial Intelligence for Future Enhancements.

OBJECTIVE 14: Identify Multi-User Conversion Possibilities

OBJECTIVE 15: Maximize Flexibility.

SYSTEM FILE DESCRIPTIONS

FILE NAME	FUNCTION
‹System Name›.DB	Contains valid databases for current SCT
‹System Name›.host	Contains access sequence for ‹System Name›
‹System Name›.SCT	Contains SCT for ‹System Name›
‹System Name›.IT	Contains IT for ‹System Name›
Trans.in	Communication from Interface to Translator
Trans.out	Communication from Translator to Interpreter
Inter.in	Communication from Communicator to Interpreter
Inter.out	Communication from Interpreter to Interface
ParamN.out	Communications Parameters (N is a variable value)

PC/MISI COMMAND TABLE

```
 1.  COS  (Connect to system)
 2.  DIS  (Disconnect from system)
 3.  SED  (Select Database)
 4.  FIS  (Find Subject)
 5.  FIA  (Find Author)
 6.  FIT  (Find Title)
 7.  FIC  (Find Corporate Source)
 8.  LAD  (List Adjacent Terms)
 9.  LIR  (List Related Terms)
10.  DIA  (Display Accession(s))
11.  COS  (Combine Sets)
12.  PRR  (Print Remote)
13.  SYN  (System News)
14.  SET  (Search Text)
15.  FIN  (Find Accession Number)
16.  LIM  (Limit Searches)
17.  SES  (Display Set Status)
18.  REL  (Release All Sets)
19.  SOR  (Sort Set)
20.  CHAF (Change Download File)
21.  SOF  (Sort Local File)
22.  MEF  (Merge Local Files)
23.  PRL  (Print File on Local Printer)
24.  DEF  (Delete Download File)
25.  DIF  (Display Records in Local File)
26.  DER  (Delete Record from Local File)
```

1. Report No. IN-82	2. Government Accession No. 183562	3. Recipient's Catalog No.
4. Title and Subtitle USL/NGT-19-010-900: THE DESIGN OF PC/MISI, A PC BASED COMMON USER INTERFACE TO REMOTE INFORMATION STORAGE AND AND RETRIEVAL SYSTEMS: PRESENTATION VISUALS		5. Report Date *DATE _____* April 24, 1985
		6. Performing Organization Code
7. Author(s) PHILIP P. HALL		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address University of Southwestern Louisiana The Center for Advanced Computer Studies P.O. Box 44330 Lafayette, LA 70504-4330		11. Contract or Grant No. NGT-19-010-900
		13. Type of Report and Period Covered FINAL; 07/01/85 - 12/31/87
12. Sponsoring Agency Name and Address		
		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This Working Paper Series entry represents a collection of presentation visuals associated with the companion report entitled "The Design of PC/MISI, A PC-Based Common User Interface to Remote Information Storage and Retrieval Systems," USL/DBMS NASA/RECON Working Paper Series report number DBMS.NASA/RECON-15.

This report represents one of the 72 attachment reports to the University of Southwestern Louisiana's Final Report on NASA Grant NGT-19-010-900. Accordingly, appropriate care should be taken in using this report out of the context of the full Final Report.

17. Key Words (Suggested by Author(s)) PC-Based Standandized Interface, PC/MISI Development, Information Storage and Retrieval Systems	18. Distribution Statement

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 29	22. Price*